Position Paper of the American Dietetic Association: Nutrition Across the Spectrum of Aging

ABSTRACT

It is the position of the American Dietetic Association that older Americans receive appropriate care; have broadened access to coordinated, comprehensive food and nutrition services; and receive the benefits of ongoing research to identify the most effective food and nutrition programs, interventions, and therapies across the spectrum of aging. Food and water and nutritional well-being are essential to the health, self-sufficiency, and quality of life for the fast growing, heterogeneous, multiracial, and ethnic populations of older adults. Many people, as they age, remain fully independent and actively engaged in their communities; however, others fare less well and need more support. A broad array of appropriate, culturally sensitive food and nutrition services, physical activities, and health and supportive care customized to the population of older adults are necessary. National, state, and local policies that promote coordination and integration of food and nutrition services into health and supportive systems are needed to maintain independence, functional ability, chronic disease management, and quality of life. Dietetics professionals can take the lead by researching and developing national, state, and local collaborative networks to incorporate effectively the food and nutrition services across the spectrum of aging.

J Am Diet Assoc. 2005;105:616-633.

POSITION STATEMENT

It is the position of the American Dietetic Association that older Americans receive appropriate care; have broadened access to coordinated, comprehensive food and nutrition services; and receive the benefits of ongoing research to identify the most effective food and nutrition programs, interventions, and therapies across the spectrum of aging.*

The enjoyment of food and nutritional well-being, along with other environmental factors, has an impact on health-related quality of life (see Figure 1), which is defined as a personal sense of physical and mental health and the ability to react to factors in the physical and social environments. Although difficult to measure, self-reported health status can be a reliable indicator of one's perceived health-related quality of life (1). Approximately 42% of Americans 65 to 74 years of age and 33% of persons 75 years of age and older rated their health as very good to excellent in 2002 (2).

Nutrition is one of the major determinants of successful aging, defined as the ability to maintain three key behaviors: low risk of disease and disease-related disability, high mental and physical function, and active engagement of life (3). Food is not only critical to one's physiological well-being but also contributes to one's social, cultural, and psychological quality of life. Research has shown that behaviors such as eating a healthful diet, being physically active, and not using tobacco are more influential than genetic factors in helping individuals avoid the deterioration associated with aging (4).

**Older Americans refers to individuals 60 years of age and older. The terms* older adults *and* elders *are used interchangeably in the text to refer to these individuals. On occasion, where defined, older adults refers to people 50 years of age and older.*

Nutrition plays multiple roles in successful aging. As a primary prevention strategy, nutrition helps promote health and functionality. As secondary and tertiary prevention, medical nutrition therapy (MNT) is an effective disease management strategy that lessens chronic disease risk, slows disease progression, and reduces disease symptoms. Thus, the added years at the end of the life cycle can be healthful, enjoyable, and productive if chronic diseases and conditions can be prevented or effectively managed. Dietetics professionals are uniquely qualified to provide a broad array of appropriate, culturally sensitive food and nutrition services in addition to encouraging physical activity and other supportive care for older Americans.

Millions of older Americans would benefit from nutritional services if they were broadly available. The United States ranks second among all countries in the number of people 80 years of age and older. In 2001, the population aged 65 years or older in the United States numbered approximately 35 million people, representing 12.4% of the population. The population 85 years of age or older was estimated at 4.5 million people (5). Approximately 3 million older Americans are foreign-born, with approximately 39% of this population from Europe, 31% from Latin America, and 22% from Asia (6).

The racial/ethnic composition of older Americans, aged 65 years and older, is diverse (7). Currently, whites represent the majority of older adults, representing 84% of the older adult population. The number of males per 100 females is 82 for adults 65 to 74 years, 65 for adults 75 to 84 years, and 41 for adults 85 years of age and older (8).

The older US population will continue to grow significantly in the future. The number of people 65 years of age or older is projected to increase to an estimated 71 million in 2030, with

0002-8223/05/10504-0019$30.00/0
doi: 10.1016/j.jada.2005.02.026

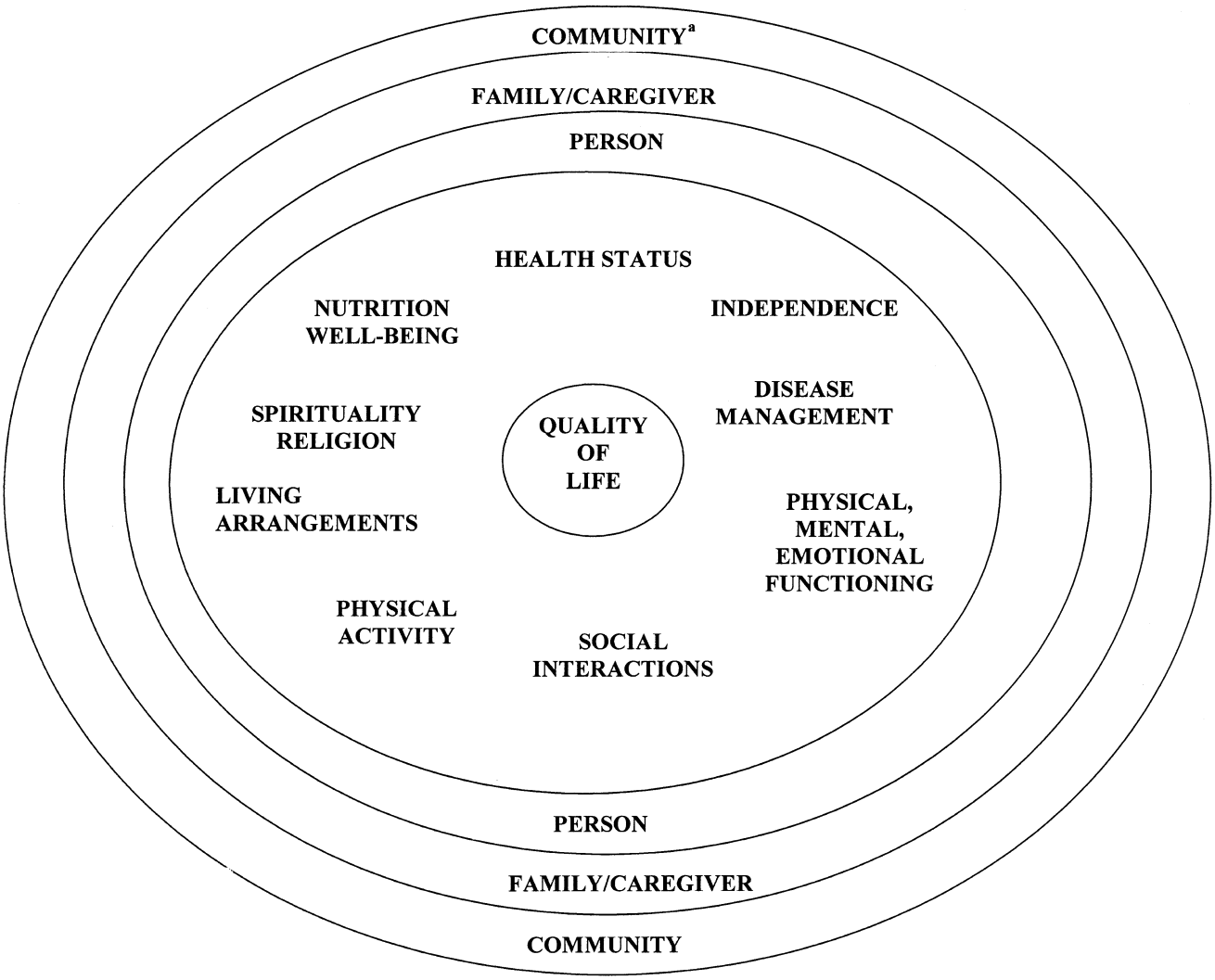

Figure 1. Factors that influence quality of life of adults 60 years and older. [a]Community includes health and supportive services at local, state, and federal levels, and health professionals and researchers.

the number of persons aged 80 years or older to increase from 9.3 million in 2000 to 19.5 million in 2030 (9). Although the sex distribution of older residents is expected to change only moderately (59% women in 2000 vs 56% in 2030), larger changes in racial/ethnic composition are expected (9). By 2050, whites are expected to represent 52.8% of the population; Hispanics, 24.3%; blacks, 13.2%; Native Americans and Alaskan Natives, 0.8%; and Asians and Pacific Islanders, 8.9% (7).

ENVIRONMENTAL IMPACTS ON HEALTH-RELATED QUALITY OF LIFE

Healthful lifestyles, early detection of diseases, immunizations, injury prevention, and self-management techniques have proven to be effective in promoting the health of older adults. In 2001, American's life expectancy reached a new record high of 77.2 years, increasing for men and women, as well as whites and blacks (10). Older Americans can expect to live longer, increasing the numbers who will reach their biological maximum age, and to be healthier than ever before (11).

Centenarians

In 2001, there were 48,000 individuals in the United States who were 100 years of age or older (5). Researchers theorize that longevity-enabling genes protect against chronic disease and slow down the aging process (12-15). At least one gene allele has been linked to increased longevity among centenarians (16,17). Environmental factors including being physically active, not smoking, not being obese, staying mental engagement, and family involvement also contribute to their longevity (15).

There are distinct nutrition-related factors that may act in a protective way against injuries in centenarians. These individuals have been found to have elevated high-density lipoprotein levels (15,18) and decreased platelet activation (19), which can exert a protective effect against cardiovascular disease. In addition, centenarians have been characterized with high levels of vitamins A and E (20) and decreased activities of both

plasma and red blood cell superoxide dismutase (21). Erythrocyte membranes of centenarians also showed decreased basal lipid peroxide levels and reduced susceptibility to peroxidation in comparisons with elderly persons aged 61 to 99 years and increased unsaturated/saturated fatty acid ratios in comparisons with persons 21 to 99 years of age. Their levels of eicosapentaenoic and docosahexaenoic acid were higher than those of persons aged 61 to 99 years (22). Research with centenarians provides evidence that nutritional status impacts longevity.

Health Disparities

Despite improvements in overall health of the United States population, members of a number of racial groups are more likely than whites to have poor health (10). For example, compared with whites, Native Americans and Alaskan Natives are 2.6 times, blacks are 2.0 times, and Hispanics are 1.9 times more likely to have diagnosed diabetes mellitus (23). One of the goals of Healthy People 2010 is to eliminate racial and ethnic disparities in health (1).

Despite a significant decline in the index of disparity for total death, stroke death, and lung cancer death rates between 1990 and 1998, substantial disparities still exist (24). These disparities are believed to be the result of complex interaction among genetic variations, environmental factors, and specific health behaviors. Inequalities in access to medical care resources can result in health disparities. For example, Hispanics and blacks aged 65 years and older were less likely than whites to have received influenza and pneumococcal vaccines in 2001 (23). Medicare plays a significant role in providing minorities' access to medical services. Significant race/ethnic disparities in use of medical services covered by Medicare are not accounted for by economic access among older adults with similar health needs (25). However, economic access did account for minority disparities in dental care, which is not covered by Medicare (25).

Inequalities in income underlie many health disparities in the United States. The median income of older persons in 2001 was $19,688 for men and $11,313 for women (5). The percentage of older adults in poverty in 2001 was 10.1%, representing 3.4 million adults (26). One out of every 12 (8.3%) elderly whites was poor, compared with 21.9% of elderly blacks and 21.8% of elderly Hispanics. Higher-than-average poverty rates for older adults were found among those who lived in central cities (12.8%), in rural areas (12.2%), and in the South (12.4%) (5). Older women had a higher poverty rate than older men, 11.8% vs 6.9%, respectively (7). Older Hispanic women who lived alone or with nonrelatives experienced the highest poverty rates (5). In general, population groups that suffer the worst health status are also those with the highest poverty rates (1). This could be attributed to food insecurity, limited access to medical care, and decreased opportunity to engage in health-promoting behaviors such as physical activity. With older racial and ethnic minorities expected to comprise an increasingly larger proportion of the US population in the future, the number of people affected by disparities in health care is expected to increase.

Hunger and Food Insecurity

Hunger and food insecurity are real issues for a portion of community-residing older adults, thus placing them at risk for poor nutritional status and deteriorating physical and mental function (27). The national data from the US Census Bureau showed that 1.4 million households with elderly members (5.5%) experienced food insecurity because of a lack of resources. Food insecurity occurs whenever the availability of nutritionally adequate and safe food, or the ability to acquire foods in socially accepted ways, is limited or uncertain. Approximately 1.5% of elderly households experienced hunger, the most severe form of food insecurity. Food insecurity rates were higher in households in which the elderly adults lived alone. Hispanic (15.4%) and black (18.9%) seniors were more likely to live in food-insecure households compared with white elderly adults (3.7%). This could be attributed to the lower incomes among minority households. Food insecure and hungry elderly adult households were more prevalent in the South than in other regions of the country and in central cities compared with suburban and rural areas (27).

Food insufficiency, a condition in which one does not have enough to eat, was assessed in the Third National Health and Examination Survey (NHANES III), 1988-1994. Older adults from food-insufficient families had lower intakes of energy, vitamin B-6, magnesium, iron, and zinc compared with older adults from food-sufficient families. These older adults also had lower serum concentrations of high-density lipoprotein cholesterol, albumin, and vitamins A and E, suggesting compromised health status (28). Older adults classified as being food insufficient are at higher risk of being underweight, defined as a body mass index less than 19. This places them at higher risk of earlier mortality (27). Compared with food-sufficient older adults, these individuals are more likely to self-report their health status as fair or poor (29).

Food and Nutrition in Health and Disease

Food is an essential component of quality of life. Meals may add a sense of security, meaning, and structure to an older adult's day, providing a person with feelings of independence and control and a sense of mastery over his/her environment (30). Food habits of older adults are determined not only by lifetime preferences and physiological changes but also by such factors as living arrangements, finances, transportation, and disability. Eating with others may increase social interactions, as well as food consumption. Women eat more (13%) when men are present, and both men and women consume more (23%) when dining with family or friends (31). The positive psychological and social aspects of eating are important pleasures of life that persist throughout life. They have potent contributions to well-being that health professionals should not forget to acknowledge.

Physiological and functional changes that occur with aging can result in changes in nutrient needs. Knowledge of nutrient requirements of older adults is growing yet is still inadequately documented. Specific dietary recommendations for energy and several essential nutrients and food components, such as dietary fiber, have been delineated in the Dietary Reference Intakes (DRIs) (32-35). Unlike the

1989 Recommended Dietary Allowances, the DRIs include the age categories 51 to 70 years and >70 years, providing a more complete set of reference values. They may be used for many purposes such as assessing current nutrient intakes and planning future nutrient intakes related to both the diet of an individual and of groups.

Both cross-sectional and longitudinal studies document that the quantity of food and energy intake decreases substantially across the spectrum of aging. Mean energy declines by 1,000 to 1,200 kcal in men and by 600 to 800 kcal in women between those aged in their 20s and those in their 80s (36). With the decrease in energy intake, there is a decline in micronutrient intakes, especially calcium, zinc, iron, and B vitamins. Data from the noninstitutionalized population 65 years of age and older assessed in NHANES III indicated that 11% of men and 10.2% of women were anemic. There was a pronounced increase in the prevalence of anemia with increasing age within the older population, and, in the age group 85 years and older, 25% of men and 20% of women were anemic. Iron deficiency either alone or in combination with folate or vitamin B-12 deficiency accounted for approximately one-third of anemia (37). Inadequate folate and vitamins B-6 and B-12 status may result in hyperhomocysteinemia, a significant risk factor for atherosclerotic vascular disease, and increased risk for cognitive dysfunction (37,38). Inadequate folate status can also lead to changes in DNA that may result in procarcinogenic effects, especially colon and breast cancers (39).

A decrease in food intake could be attributed to changes in taste and flavor sensations, such as the decline in odor perception with age (40). Older women with reduced olfaction have a reduced interest in cooking and consuming a variety of foods. The decline in taste sensitivity with age occurs in virtually every older adult as well; taste thresholds increase two to nine times with aging. Consequently, flavor-enhanced foods are preferred by older persons. Research has shown that retirement home residents given a flavor-enhanced diet consume more food (31). Flavor-enhanced diets have also been shown to enhance immune function and increase grip strength (40). The quality of diets consumed by a nationally representative sample of 1,392 older noninstitutionalized Americans examined in the 1999-2000 NHANES has been evaluated using the Healthy Eating Index (HEI) (28). The HEI consists of 10 components and provides an overall picture of the type and quantity of foods people eat, their compliance with specific dietary recommendations, and the variety in their diets. The mean HEI score for all persons 65 years of age and older was 67.6 out of 100, which meant that their diets needed improvement. The highest mean component score was for variety. The lowest component scores were for intakes of milk and fruits. Approximately 20% of the people 65 years of age and older had good diets, represented by a score of 81 and above. Approximately 14% had poor diets, represented by a score of less than 51. The HEI score was significantly lower for older persons in poverty than for those not in poverty (41).

The consumption of poor-quality diets can result in inadequate energy and essential nutrient intakes, resulting in malnutrition. The key predictors of malnutrition are loss of appetite and anorexia. The physiologic regulation of appetite differs fundamentally in older adults compared with younger persons (42). Older adults exhibit less hunger and earlier satiety. Impaired appetite contributes to the undernutrition seen in older adults in both community and institutionalized settings.

Dehydration, a form of malunutrition, is a major problem in older adults, especially persons over 85 years and the institutionalized. Dehydration is associated with swallowing impairment and feeding dependency in hospitalized older adults. Dehydration risk increases because of the kidney's decreased ability to concentrate urine, blunted thirst sensation, decreased rennin activity and aldosterone secretion, relative renal resistance to vasopressin, changes in functional status, delirium and dementia, medication adverse effects, and mobility disorders. Fear of incontinence and increased arthritic pain resulting from numerous trips to the toilet may also interfere with consumption of adequate fluid intake. In older adults, dehydration can result in constipation, fecal impaction, cognitive impairment, functional decline, and death (43).

Consuming a wide variety of foods is considered the best way to ensure balance of nutrients and consumption of appropriate amounts of healthful food components. Although most of the major preventable causes of death have declined or changed minimally since 1990, deaths because of poor diet and physical inactivity have increased by 33% in the United States (44). The recommendation to consume fruits and vegetables to lower risk for chronic diseases has been and continues to be a key component of dietary guidance. However, approximately 42% of older men and 38% of older women do not meet the recommended intake of vegetables, and 29% of older men and 32% of older women do not meet the recommended intake of fruit (45). Only 32% of persons 65 years of age and older consume five or more fruit and vegetables a day (46). Unfortunately, many of the fruits and vegetables consumed are not those that are the most consistently associated with reduced disease risk. Fruits most closely associated with reduced disease risk (citrus, melons, berries) make up 48% of fruit servings. Only 25% of vegetables consumed are classified as being rich in putative protective phytochemicals and associated with reduced disease risk (dark green, deep yellow/orange vegetables, tomato products) (47).

It is important for older adults to adopt dietary and lifestyle practices that prevent and manage chronic conditions, thereby maximizing their chances for successful aging. In the United States, approximately 80% of all persons 65 years of age and older have at least one chronic condition, and 50% have at least two chronic conditions (9). Dietary patterns and lifestyle practices are associated with mortality from heart disease, cancer, cerebrovascular disease, chronic lower respiratory diseases, diabetes mellitus, and influenza and pneumonia diseases, which were among the top five leading causes of death for all persons 65 years of age and older in 2000 (48). The DASH diet (Dietary Approaches to Stop Hypertension) has been shown to have a positive effect on both systolic and diastolic blood pressure (49), and several studies have indicated that adherence to the Mediterranean diet, which shares

many of the characteristics with the DASH diet, is associated with a reduction in total and cardiovascular mortality and inversely associated with systolic and diastolic blood pressure (50,51)

When dietary selection is limited, nutrient supplementation with low-dose multivitamin and mineral supplements can be useful in meeting recommended intake levels. The potential impact of food plus supplement intake on the maintenance of physical and cognitive function in old age has profound consequences for optimization of health, independence, and well-being (52). Among the population 80 years of age and older examined in the NHANES III, 42% of men and 55% of women used supplements (53). With this large proportion of older adults using supplements, dietetics professionals play an important role in counseling on their appropriate use. This is especially critical in the case of folate because intake in excess of the tolerable upper intake level may mask the diagnosis of a vitamin B-12 deficiency. With the 1998 folic acid fortification of cereal grain products, ready-to-eat cereals can contribute a significant amount of folic acid to the diets of older adults. When the intake of folic acid-fortified foods is combined with supplements containing folic acid, excessive levels may be consumed.

Dietary excesses and/or poor food choices in combination with inactivity have resulted in an increased prevalence of overweight and obesity over the past 2 decades. Among the older American population, over half are overweight and approximately one-third are obese. Older black women have the highest prevalence for both overweight and obesity compared with white and Mexican American men and women and black men (54). With increasing life expectancy and increasing prevalence of overweight and obesity, the burden of ill health in the future may increase.

The epidemic of overweight and obesity present a major public health problem and a challenge to dietetics professionals. Overweight contributes considerably to increased morbidity and disability. Obesity is associated with a higher risk for cardiovascular disease, dyslipidemia, selected cancers, hypertension, stroke, sleep apnea, diabetes mellitus, osteoarthritis (55), and suboptimal physical functioning (56). In fact, the increased prevalence of hypertension over the past decade is associated with the increase in obesity and in the numbers of older adults. Sixty percent of men and 70% of women, aged 65 to 74 years and 68% of men and 84% of women aged 75 years and older have hypertension. Blacks have the highest prevalence rates for hypertension (57). The rise in blood pressure from increased salt intake can be blunted by a diet high in potassium or a low-fat, mineral-rich diet, such as the DASH diet (49). With their expertise in food, dietetics professionals can be valuable members of a health professional team, designing and implementing effective community-based obesity prevention and hypertension management programs.

Another nutrition-related problem among older adults is osteoporosis. Despite our understanding of the prevention and treatment of osteoporosis, this disease along with low bone mass affects almost 44 million US women and men aged 50 years and older and is expected to affect half the population over the age of 50 years in 2020 (58). The direct care costs for osteoporotic fractures range from $12 to $18 billion each year (58). A lack of knowledge or understanding on the part of the consumer may be a contributing factor. For instance, one study found that only 15% of low-income, Mexican American postmenopausal women recall their health care provider counseling them about prevention (59). The surgeon general's report on bone health and osteoporosis is a call for Americans to take action to improve and maintain healthy bones. The recommendations include consuming recommended amounts of calcium and vitamin D, maintaining a healthful body weight, and being physically active, along with minimizing the risk of falls (58).

Historically, calcium and vitamin D from dietary or supplement sources have been the major therapeutic focus for bone health (60). However, other nutrients such as protein, vitamins A and K, magnesium, and phytoestrogens are also involved in bone health, and research needs to be conducted to expand our understanding of the roles of these nutrients in bone health of apparently healthy and frail older adults (61,62).

The role of antioxidants in the aging process and reduction of disease risk is another important area of investigation. Cataracts and age-related macular degeneration have a nutrition etiology. Evidence suggests that low dietary intakes of vitamins C and E and carotenoids increase cataract risk. Although age-related macular degeneration is less common than cataracts in older adults, it is the leading cause of irreversible vision loss in the developed world (63,64). It is estimated that 1.6% of the population 50 to 65 years of age is affected, increasing to 30% in the over 75 years of age group (63). Lycopene, lutein, and zeaxanthin, the major carotenoids found in human blood and tissue, act as efficient antioxidants, preventing light-exposed tissues, skin, and eyes from light-induced damage. Experimental and epidemiological studies suggest that low antioxidant intake (carotenoids, vitamins C and E, zinc) may be associated with the occurrence of age-related macular degeneration (63). Thus, adequate intakes of carotenoids, especially lutein and zeaxanthin, in the form of fruits and vegetables, may reduce the risk of developing age-related macular degeneration as well as cataracts (52,63).

The medical treatment for the management of such conditions as obesity, hyperlipidemia, diabetes mellitus, hypertension, osteoporosis, and cardiovascular and cerebrovascular diseases requires the application of MNT and lifestyle counseling as a part of the Nutrition Care Process (65). Pharmacotherapy may be necessary to achieve optimal disease control for some of these long-term conditions. The dietetics professional is an essential member of a multidisciplinary health care team.

Physical Activity

Regular physical activity provides numerous health benefits to older adults, including weight management and improvements in blood pressure, diabetes mellitus, lipid profile, osteoarthritis, and osteoporosis and optimal mental health, namely cognitive and emotional functioning, and managing arthritis (66,67). It is also associated with decreased mortality and age-related morbidity in older adults (66). Endurance exercise

may increase food intake (68), yet physical inactivity among older adults is pervasive. Approximately 75% of older Americans are insufficiently active to achieve the benefits of exercise. Approximately 47% of persons 65 to 74 years of age and 61% of persons 75 years of age and older are physically inactive (69).

A review of correlational studies and prospective longitudinal studies consistently found that long-term physical activity is related to postponed disability and independent living in the oldest populations (70). Even in individuals with chronic diseases, systematic participation in physical activities enhances physical function (70). In a longitudinal study by Kahana and colleagues, exercise was predictive of fewer instrumental activities of daily living limitations, greater longevity, positive affect, and quality of life (71). Research has shown that strength training in midlife can prevent the weight gain associated with aging (72). It is recommended that older adults participate in aerobic exercise, strength training, and balance and flexibility exercises (67). Encouraging physical activity in older adults can help individuals reach and maintain their highest level of function and health-related quality of life. All intensities of exercise have been found to be beneficial.

Low- to moderate-intensity exercises have been shown to improve cardiorespiratory function (73). Walking is associated with reduced diabetes incidence and with lower mortality in adults with diabetes mellitus (74). Habitual walking can improve physical performance, fitness, and prevention of physical disabilities in older adults (73).

Intensive exercise training has been shown to improve measures of physical functioning and preclinical disability in community-dwelling older adults with impairments of physical performance (75). Regular physical activity, especially resistance and high-impact activities, contribute to the development of peak bone mass, reduced risk of hip fractures, and may reduce falls in older adults (68,76).

To enhance long-term compliance, the exercise prescription should be straightforward, fun, and geared toward the older adult's health needs, beliefs, and goals (67). Exercise adherence of older adults has been associated with self-efficacy and fitness outcome measures (77). Using Tai Chi as an exercise mode, researchers have found that improvements in older adults' self-efficacy of movement were related to increased levels of perceived physical capability (78). Research using focus groups with older adults from seven cultural groups identified walking as the exercise of choice across all groups. Health served as both a motivator and a barrier to physical activity. Other factors that influenced physical activity were weather, transportation, and personal safety (79). Dietetics professionals in collaboration with other health professions can play a role in both developing culturally appropriate interventions that increase older adults' confidence to overcome barriers to exercise and to achieve realistic fitness outcomes.

Spirituality and Religion

Various forms of religious/spiritual appraisal are associated with older adults' use of positive reframing and active forms of general coping (80). A metaanalysis of over 100 studies found that greater religiosity was associated with fewer depressive symptoms (81). Religious activities, such as engaging in prayer, and spiritual experiences in older persons are associated with greater social support and better psychological health (82). It appears that successful aging is also associated with religion and spirituality. By acknowledging a client's spirituality and religion, dietetics professionals can better support their clients and their adjustments to illness.

Disabilities

Older adults are living longer with fewer disabilities, and this trend is expected to continue (83). Several factors such as improvements in public health measures, significant increases in education and finances, health-related behavioral changes such as smoking cessation, improved control and treatment of diseases, and use of new surgical interventions and newly developed drugs contribute to the dramatic decline in disability. There is a strong relationship between self-reported health status and disability status. Among older adults with a severe disability, 68% reported their health as fair or poor (5).

Disability is often measured by limitations in performing activities of daily living and/or instrumental activities of daily living. In 2000, 34.7% of all persons 65 years of age and older had a limitation of activity caused by a chronic condition, and the percentage increased with age. More black elderly adults experienced a limitation of activities of daily living and instrumental activities of daily living than white, Asian, or Hispanic seniors (84). Among home health care elderly recipients, 15.9% received help with eating, 12.2% with shopping for groceries and clothes, and 21.8% with preparing meals. Among elderly nursing home residents, 47.1% received assistance with eating (7).

Arthritis is the leading cause of disability, affecting approximately 59% of all older adults. Among persons 70 years of age and older with arthritis, 50% need help with activities of daily living, compared with 23% of persons of similar ages without arthritis. Among older adults with arthritis, 71% require assistance with instrumental activities of daily living. Older persons with arthritis utilize a social worker, adult day care, rehabilitation, transportation, and/or Meals on Wheels significantly more than those older adults who do not have arthritis (85). Dietetics professionals play an important role in ensuring that individuals with disabilities receive optimal nutrition.

Functional disability, falls, and decreased bone density, in addition to glucose intolerance, and decreased heat and cold tolerance in older adults are linked to sarcopenia, the loss of muscle mass with aging (86). Sarcopenia is a common problem in adults over the age of 65 years and increases with age. Among a community-dwelling older adult volunteer population, the prevalence of sarcopenia in men and women, 80 years of age and older, was 52.9% and 31% of the population, respectively (87). Decreased physical activity, malnutrition, increased cytokine activity, oxidative stress, and abnormalities in growth hormone and steroid axes have been implicated in the etiology of sarcopenia. Currently, strength

training using progressive resistance training is the best intervention shown to slow down or reverse sarcopenia (86).

Caregivers

Informal caregivers are responsible for providing the majority of care for underserved populations, such as frail older adults in rural settings (88), as well as for older adults with dementia and hospice patients (89). The majority of informal caregivers receive no help from formal caregivers (90). Family caregivers engage in activities that support good nutrition, including shopping, meal preparation, feeding the care recipient, and, when required, administration of home enteral nutrition. Estimates of the economic value of this informal assistance are approximately $200 billion annually (91).

This level of care does not come without costs for caregivers, particularly those who are older (92,93). Caregiver burden, defined as excessive stress, can result in clinical depression, fatigue, and deterioration in the caregiver's nutritional and health status (91,93,94). Caregiving can increase risk for chronic disease, thereby reducing the ability of the caregiver to provide care. This can result in impairment of the quality of life of both the caregiver and the care recipient. Research has shown that caregiver stress and depression are significant predictors of health outcomes of older adults (95).

Through the Older Americans Act (OAA) state and local aging network, the National Family Caregiver Support Program helps family caregivers continue with and improve informal caregiving through their services. These services include providing information regarding available resources and in gaining access to these resources; individual counseling, support groups, and training to caregivers that facilitate decision making and problem solving associated with caregiving; and respite care to provide temporary relief from the caregiving role (92).

Dietetics professionals can work with community aging services programs in alerting them to the importance of nutrition for both caregiver and care recipient, making targeted nutrition information messages available and providing nutrition counseling. It cannot be assumed that caregivers have the information and techniques necessary to provide the nutrition services required by their care recipients (93,96). Caregivers may lack the information and skills needed to provide the encouragement to eat, to modify food consistency, or to consider the use of nutritional supplements (96). Nutrition education or in-depth nutritional counseling targeted for specific diseases and conditions (eg, Alzheimer's disease), recuperation from a hip fracture, or maintenance on a renal diet may be necessary to inform the caregiver (93,94). Nutrition information targeted to promote good eating practices for the caregiver is also needed (93,94).

Living Arrangements

Living arrangements can impact on diet quality, and their influence differs among race/ethnic groups (97). Approximately 95% of the older adult population is noninstitutionalized, resulting in a demand for a range of housing options from adult communities for persons over 55 years of age to continuing care retirement communities to assisted living facilities to nursing homes. Approximately 73% of noninstitutionalized men and 41% of noninstitutionalized women lived with their spouse in 2000. In addition to living with a spouse or another adult, approximately 400,000 older adults have grandchildren living with them (5).

The proportion living with their spouse decreases with age, especially for women (7). More white and Asian/Pacific Islander men live with a spouse compared with black and Hispanic men. Dietetics professionals need to recognize that approximately 40% of white and black women live alone (98) and that healthy individuals have recorded food intakes up to 44% greater when eating with other people than when eating alone (31).

Despite the rapid growth in senior housing in recent years, there are still gaps in the service delivery system. A National Study of Adult Day Care Services confirmed that there are 3,407 adult day care centers in the United States. Given the current US population, 5,415 new adult day care centers are needed nationwide, specifically, 1,424 in rural areas and 3,991 in urban areas (99).

The average age of the people attending the adult day care center is 72 years. These individuals typically live with an adult child (35%) or with their spouse (20%). Fifty-two percent of persons have dementia, whereas the remaining 42% are frail elderly adults in need of assistance or at risk for social isolation. Twenty-four percent need assistance with eating. The average length of stay in the adult care center is 2 years, with discharge being either placement in an assisted-living facility or death (99).

Dietetics professionals who specialize in gerontology and geriatrics can be a valuable resource to older adults, health professionals, and both formal and informal caregivers across all residential settings. They can develop and implement programs that address health promotion, chronic disease management, and use of special equipment and assistance devices and technologies related to food shopping, meal preparation, and eating that will enable older adults to maintain their independence. Supplementing traditional informal caregiving with health services such as dietetics professionals, physical therapists, visiting nurses, and hospice care workers will also allow older adults to remain home longer.

ACCESS TO COORDINATED, COMPREHENSIVE FOOD AND NUTRITION SERVICES

Broadened access to coordinated, comprehensive food and nutrition services has the potential to provide a greater percentage of older adults with a wider variety of food and nutrition services that support health, independence, and well-being.

Strategies to broaden access must be considered within the context of a changing environment. Older individuals are in better health and are living longer (11,100). Good nutrition and routine physical activity help reduce the risk of chronic diseases related to aging and facilitate the ability to remain independent at home (11,43). It is expected that, by 2030, 95% of those aged 65 years and older will be living in community settings (11). Federal and state agencies are adopting home and community options, including Medicaid home and

community based waivers, to contain the high costs of health and nursing facilities (11,43). The Medicare Prescription Drug, Improvement, and Modernization Act, enacted in 2003, adds a prevention component creating new opportunities for screenings, including nutrition screening and chronic care models that include MNT (11).

It is said that today's assisted-living facilities are yesterday's nursing homes and today's nursing homes are yesterday's hospitals (11,101). Older people are being discharged from acute care and long-term care facilities to home settings often before recuperation is complete and frequently without a plan for home and community follow-up services (43). Currently, no coordinated, comprehensive system exists to provide the wide range of food and nutrition services needed to accommodate variations in economic, social, supportive, and health needs across the spectrum of aging and diverse residential settings (11,43). For the most part, health care and supportive services are provided through two separate delivery systems (11,43). This may result in different eligibility requirements, funding streams, and varying amounts and types of services across systems (43).

Older adults themselves may be unaware of how a coordinated, comprehensive system could contribute to chronic disease management and well-being. It has been reported that older Americans recognize the importance of nutrition in managing chronic disease; however, they turn first to medication and exercise for treatment before considering nutrition (11). Furthermore, the word "diet" has negative connotations and older adults consider physicians to be health experts and look to them first to provide nutrition information (11).

Public and private agencies, decision makers, funders, and service providers make funding and continuation decisions based on client and program outcomes and improvements. Dietetics professionals have begun to collect outcome data to demonstrate the effectiveness of food and nutrition assistance programs for older adults; however, continued evidence is necessary to inform the quantitative and qualitative aspects of the decision-making process.

This section addresses the food and nutrition needs of this diverse population and factors influencing broadened access. It provides examples of food and nutrition programs that can make a difference, examines the role of MNT, describes applied research studies that demonstrate effectiveness, and highlights the role of the dietetics professional in expanding access.

Publicly Funded Programs

Publicly funded programs by the US Administration on Aging and the US Department of Agriculture (USDA) provide food and nutrition services for this population. These programs provide access to nutrient-dense foods and nutritionally adequate meals. They also have the potential to improve nutritional well-being and promote health, functional independence, and quality of life. However, universal access across all communities is limited in part to availability of programs in all localities, eligibility requirements for participants, and limited funding. Dietetics professionals working in community settings can build partnerships to share information with colleagues, agencies, and older adults regarding existing programs and resources and encourage referrals and linkages that expand access. They can proactively promote the role of good nutrition in health promotion and physical activity programs.

Older Americans Act. The federally-funded OAA, due for reauthorization in 2005, is perhaps the earliest and most comprehensive program to provide an array of services and support to help older adults aged 60 years and older to remain independent in home and community settings (102). The OAA targets those persons who are poor, those who are members of minority groups*, and those who are living in rural areas with limited access to services. The OAA is unique in that it sets parameters and general requirements to support a bottom-up, community-based, planning and service delivery system. Decisions are made at the individual community level concerning local area plans, specific programs and services to be provided and their delivery mechanism, and methods to monitor effectiveness and quality (102).

The OAA is administered by the US Administration on Aging through the National Aging Services Network (OAA Network) consisting of 244 Tribal or Native organizations or 56 State Units on Aging in collaboration with 655 local Area Agencies on Aging, 29,000 service providers, and over 500,000 volunteers.

Dietetics professionals working in community settings can build partnerships to share information with colleagues, agencies, and older adults regarding existing programs and resources and encourage referrals and linkages that expand access.

Title III** of the OAA authorizes a broad array of community-based nutrition, health, and supportive services (102). These services may include information, referral, and transportation, adult day care, senior center activities, pension counseling, and health and physical activity programs. In-home care may include home maintenance assistance and home-health and personal care. Caregiver support can include respite services, nutrition advice, and information and assistance with care coordination (103).

An integral component is the Title IIIC Nutrition Program (OAA Nutrition Program, formerly known as the Elderly Nutrition Program), which authorized an array of food and nutrition services that promote health, functional independence, and help manage chronic disease (103). It serves two community-residing populations: older adults who are ambulatory and those who are frail and homebound. Under the OAA Nutrition Program, nutritious meals that meet the DRIs/Adequate Intakes/Recommended Dietary Allowances and local cultural preferences are delivered to the homebound or provided at

*Native Americans, Alaska Natives and Native Hawaiians
**and Title VI

congregate sites. Additional nutrition services that may be provided include screening, assessment, education, and counseling. The availability of these services and whether they are provided by a dietetics professional varies depending on state and local decision makers and program administrators (43,104).

The OAA Congregate Nutrition Program provides healthful meals, culturally appropriate nutrition education, physical activity, and opportunities for socialization (103). A recent report of 473 recipients found over 64% of the population to be aged 75 years or older, at lower income, and at nutritional risk. In addition, 58% reported that the congregate meals provided half or more of their food intake. Dietary intake for the congregate recipients was equal or better than that reported by the general population aged 60 years or older (103).

The OAA Home Delivered Nutrition Program serves a vulnerable population that is older, frailer, poorer, and at higher nutrition risk and has more nutrition-related functional impairments; 62% have reported that the meals provided half or more of their daily food intake. Dietary intake among the homebound participants was found to be equal or better than dietary intake for the general population aged 60 years or older (103).

Most OAA Home Delivered Nutrition Programs provide only one meal per day, which, in many cases, may not be sufficient, given this frail population (104,105). Recent studies have been conducted with the Elderly Nutrition Program homebound population to determine the effects of receiving more than one meal per day on dietary intake and nutritional well-being (106,107). One study compared the effects of providing 102 homebound subjects at nutritional risk with three meals and two snacks 7 days per week (enhanced program) to meet 100% of the DRIs with the traditional, daily, 5-day-per-week hot noon meal that met one-third of the DRIs delivered to 101 subjects (106). Subjects receiving the enhanced meals gained significantly more weight than their traditional meal counterparts during both baseline to 3 months and baseline to 6 months. Although not statistically significant, more subjects receiving the enhanced program decreased their nutritional risk and did so faster than the traditional meal group (106).

A cross-sectional field study evaluated the effects of providing breakfast and lunch on nutritional status and quality of life between two groups of frail homebound adults ranging in age from 60 to 100 years (107). The group (n=167) receiving the home-delivered breakfast and lunch had significantly greater energy/nutrient intakes and levels of food security and fewer depressive symptoms than the group (n=214) receiving lunch only. This suggests that the addition of a breakfast as a second meal can improve the well-being of frail homebound older persons (107).

These studies demonstrate the importance of screening and assessing diverse nutritional needs in an at-risk homebound population and then providing targeted interventions to improve nutritional status and prevent decline (106,107). However, there are challenges when working with the OAA Home Delivered Nutrition Program participants to measure accurately the dietary intake/quality and subsequent improvements in well-being (108).

The OAA Nutrition Program and National Family Caregiver Support Program provide a venue for dietetics professionals to improve the nutritional status and well-being of community-residing older persons and their older caregivers. Congregate and home-delivered meals and nutrition education and information provide primary prevention to protect against nutritional risk. The OAA Nutrition Program encourages the use of nutrition as secondary and tertiary intervention through nutrition assessment and nutrition counseling. Given the number of older adults who are diabetic or at risk, especially minorities, opportunities exist to contract with dietetics professionals who are Medicare providers to provide diabetes education. However, adequate funding and the use of dietetics professionals are uneven across the nation (104).

USDA food and nutrition assistance programs. The USDA administers community-based food and nutrition assistance programs, including the Food Stamp Program, the Senior Farmers Market Nutrition Program, the Child and Adult Care Food Program, the Emergency Food Assistance Program, and the Commodity Supplemental Food Program (109-114) for older adults to improve dietary intake and quality through provision of both food and nutrition education. However, each program functions as a discrete unit, having its own needs, income, and asset eligibility requirements, and may target other populations in addition to older adults and may not be available in all states. Thus, these important USDA programs differ from the more comprehensive coordinated nutrition, health, and supportive services provided under the OAA. These programs, particularly the Food Stamp Program and the Senior Farmers Market Nutrition Program, promote primary prevention through nutrition education and opportunities for collaboration among dietetics professionals, Extension, and other community resources to increase referrals across programs.

The Food Stamp Program. The Food Stamp Program, available to all eligible persons meeting need and asset requirements, provides older adults with access to nutrient-dense foods to improve quality and variety of dietary intake. Older adults eligible to receive food stamps have been shown to consume diets below recommended nutrient levels and recommended servings from the Food Guide Pyramid (115,116). However, those who do participate have significantly lower incomes, are at higher nutritional risk, have higher body mass indexes, have more functional impairments, and tend to be less healthful than their eligible counterparts who do not participate (115,116). Program participants have reported being better able to purchase needed foods, and there is evidence of coordination among community programs serving older adults (115,116).

Efforts have been made to facilitate food stamp usage among eligible older adults (109). However, barriers exist. Some may perceive the monthly benefit amount to be too low and not worth the trouble to apply (27,109). Potential recipients may not know of the Food Stamp Program because there is limited awareness and information on existing programs and eligibility. Many are embarrassed and

do not want the stigma of receiving government assistance. Others lack the transportation or are not physically able to apply in person (27,115).

Senior Farmers Market Nutrition Program. The Senior Farmers Market Nutrition Program awards grants to US states, territories, and recognized Indian Tribal Organizations to provide low-income older adults with coupons in exchange for fresh, nutritious, unprepared fruits, vegetables, and herbs obtained from farmers markets, community-supported agriculture programs, and roadside stands (110,111). Although there is variation in program administration, there is evidence that the Senior Farmers Market Nutrition Program is successful in increasing the amount of fruits and vegetables consumed; in providing nutrition information; in serving the homebound, normally a nontraditional farmers market population; in facilitating coordination among community agencies to promote the program; and in creating a new customer base for farming organizations (117,118).

Home care can be used to supplement services provided by informal caregivers, with the caveat of adding to caregiver burden.

Dietetics professionals can work within community networks to promote the potential of the Food Stamp Program and the Senior Farmers Market Nutrition Program as valuable opportunities to improve the quality and variety of dietary intake and eliminate barriers to increase access and build on the motivation of older adults to participate (115). Nutrition education messages targeted appropriately to local populations could improve food choices. However, more research is needed to document the effectiveness of these programs in improving the nutritional status of older adults.

MNT and Improved Disease Management

The important cost-effective role MNT plays in the prevention and management of chronic diseases and conditions has been well documented (119). Furthermore, the unique education and skills dietetics professionals have in helping older adults manage therapeutic nutrition modalities have been recognized (119). The Institute of Medicine has recommended that MNT services be reimbursed under Medicare Part B, as a part of interdisciplinary care, and that the services of dietetics professionals on physician referral be included as a benefit (119). There is now coverage for Medicare beneficiaries to receive outpatient diabetes self-management training in which nutrition is one of the content areas in the curriculum and for nondialysis kidney disease.

Dietetics professionals will have more opportunities to work with older adults and improve chronic disease management through two major expansions of MNT under the new Medicare Reform/Prescription Drug Law (120). An initial preventive physical examination to identify physical conditions for new Medicare beneficiaries became effective January 1, 2005, and allows preventive services including MNT provided by a registered dietitian for diabetes and chronic kidney disease. The second expansion will address chronic disease management and is scheduled to begin January 1, 2006, with a 3- to 5-year phase-in period. The first phase will cover at least 10% of the beneficiaries. Phase two will examine the functioning and cost-effectiveness of the program before expansion to all beneficiaries. As appropriate, each chronic care management plan will include self-care education through approaches such as disease management or MNT and education for primary caregivers and family members (120).

MNT in home settings. Home care may be a more cost-effective choice; it can cost as little as 19% of the cost of a nursing facility and approximately 4% of the cost of a day in an inpatient facility. Home care can be used to supplement services provided by informal caregivers, with the caveat of adding to caregiver burden. Home-health organizations provide a variety of supportive, personal, and health care services. Hospice organizations provide palliative care and supportive social, emotional, and spiritual services for individuals who are terminally ill and their loved ones. Medicare provides a hospice benefit (121).

Cost-effective success stories in providing nutrition services to older adults have been documented (121). Medicare Part B provides reimbursement for eligible beneficiaries. Dietetics professionals must promote the cost-effectiveness of MNT for this population (121) and the value of provision by qualified nutrition professionals.

Older adults with nutrition needs might be overlooked because Medicare beneficiaries must be screened using the Outcome and Assessment Information Set (122). A study compared the nutrition screening and assessment indicators on the Outcome and Assessment Information Set data and home-care agency instruments found that clients determined to be at nutrition risk were not consistently referred to a dietetics professional (122).

In addition to Medicare, older adults may also be eligible for Medicaid benefits. Medicaid is a joint federal/state-funded health insurance program for certain low-income, needy people, including those who are aged, blind, or disabled and people eligible to receive federal income assistance. Many states are trying to delay the high costs of nursing facility placement through the use of alternative home and community-based programs. The home and community-based Medicaid Waiver Program under the Social Security Act allows states to use Medicaid funds to provide in-home and community-based services traditionally not covered by Medicaid to individuals who are aged, disabled, or nursing facility certified (43). The program is administered by a designated state agency and the federal Centers for Medicare and Medicaid Services. Each state selects the array of services to provide. Seven services listed under the Social Security Act that may be provided under the Waiver Program are as follows: case management, homemaker/home health aide services, personal care services, adult day health, habilitation, and respite care for caregivers. Additional services may be provided subject to Centers for Medicare and Medicaid Services approval and include the following: home-delivered

meals, nutritional counseling, risk reduction, nonmedical transportation, in-home support services, minor home modifications, and adult day services (123). Dietetics professionals can work at the state and local levels to influence policy and improve nutritional well-being of older adults. They can collect data on nutrition-related health needs, and, based on this evidence, suggest appropriate services to their respective state agencies and local aging network colleagues.

MNT in residential health care facilities. Older adults residing in residential health care facilities are among the frailest and require skilled nursing care and in-depth, ongoing, individualized nutritional assessments and therapies (124,125).

The average length of stay in a nursing facility is 2.5 years and in essence becomes one's home. Poor health outcomes resulting from malnutrition and dehydration are common problems. Residents have the right to refuse treatment and services, and this has implications for the provision of food and MNT and for maintenance of quality of life. Although residents are very frail, the value of a therapeutic diet must be carefully weighed against its effect on the resident's quality of life (43,124). Providing adequate staffing to allow the resident sufficient time to eat in a pleasurable environment within financial constraints poses serious quality problems for dietetics professionals (43,124). Dietetics professionals must advocate for their residents in the face of strict financial restrictions and regulations.

The availability of MNT protocols can improve the nutritional status in residential facilities and document the value of dietetics professionals' contributions. This was demonstrated in a study to determine the rate of unintentional weight loss in older adults after admission into residential health care facilities and to measure the effectiveness of a new MNT protocol to prevent and treat unintentional weight loss (125). Both groups of registered dietitians were equally successful in treating the weight-loss problems. However, the MNT protocol demonstrated the ability to identify more quickly the unintentional weight loss in this at-risk population (125). This study gave insight into how registered dietitians in residential facilities practice with respect to the quality of nutrition care provided to address unintentional weight loss; usual care group closely mirrored the care provided in the new MNT protocol. This study with its focus on weight loss is particularly important given the recent inclusion of a weight-loss quality measure to the list of nursing home quality measures that Centers for Medicare and Medicaid Services publicly reports (126).

Food and Nutrition Regulations in Assisted-Living Facilities

A national survey of 50 states found that 45 had some food and nutrition regulations in place; however, states varied widely in the establishment of standards and level of regulation. Chao and colleagues found variation in the level of foodservice regulation and general nutrition services (127). Forty of 50 states surveyed did require provision of therapeutic diets, and 30 states required a dietetics professional to review menus and required that menus meet therapeutic needs as identified in care plans. The authors speculate that states without regulations specific to assisted living might have had regulations in place under other statutes. However, the large number of states with nutrition-related regulations may reflect the increased growth in assisted-living facilities and the fact that more states have accepted Medicaid clients. There is now a broader range of services, including those nutrition services needed by residents with higher acuity levels (127).

NUTRITION CARE OUTCOMES AND QUALITY OF LIFE ACROSS THE SPECTRUM OF AGING

Program performance and quality improvement/assurance mechanisms must evaluate client satisfaction and document positive health, independence, or quality-of-life outcomes (43). States are in the early developmental stage in measuring resident satisfaction and quality in nursing facilities and assisted-living facilities (128). Evidence-based guidelines/protocols are being developed (129), and standards of professional practice for dietetics professionals working with older adults are in place (43). The use of Dietetic Practice-Based Research Networks to document outcomes of food and nutrition programs for older adults has been proposed (130). Dietetics professionals working with older adults should consider this venue as a way of getting started in collecting outcomes data and begin to use the data for benchmarking (130). Such evidence can be used to support decision making regarding the costs and effectiveness of various food and nutrition services to implement.

It is important to demonstrate that food and nutrition services including MNT contribute to quality of life for older adults. Barr and Schumacher raise the issue that a consistent outcome measure used across clinical conditions and patient populations to measure nutritional quality of life is lacking (131). They propose the development of a survey to measure the impact of MNT, as an intervention, on quality of life and that quality of life be measured at baseline and during the course of treatment and then aggregate the results to be used in quality improvement. They have begun the process using focus groups, surveys, and consensus to develop a nutritional quality-of-life framework (132). Six clusters, each with items, have been identified to represent nutritional quality-of-life aspects, including the following: food impact, self-image, psychological factors, social/interpersonal, physical, and self-efficacy. The next step in the development process will involve psychometric and clinical testing of the items before they can be used to measure nutritional quality of life (132).

OPPORTUNITIES FOR DIETETICS PROFESSIONALS AND POLICY IMPLICATIONS

Aging has been identified as the second highest priority issue for the American Dietetic Association (11). This is appropriate given that good nutritional status and personal well-being in older adults benefit both the individual and society: health is improved, dependence is decreased, hospitalization stays and time required to recuperate from illness are reduced, and utilization of health care resources is contained (43). The role of the dietetics professional is critical because evidence demonstrates that targeted MNT in the treatment of

Clinical Setting
- Implement a multidisciplinary approach to nutrition care; collaborate with other health professionals to develop, implement, monitor and evaluate interventions that improve care of elders and maintain or enhance quality of life
- Evaluate the benefits of medical nutrition therapy
- Develop case-management guidelines
- Assist caregivers with implementation of nutritional interventions
- Promote outcomes research validating the RD/DTR influence on positive clinical and quality-of-life outcomes in long-term care, home health
- Sensitize interdisciplinary colleagues to terminology (eg, MNT)
- Accept cross-functional leadership roles to change the availability of nutrition services and increased use of the dietetics professional
- Advocate legislative change
- Networking among dietetic practice groups

Community Setting
- Expand roles in home care, and play a significant role in preparing individuals for caregiving responsibilities and, especially, for caregivers of patients receiving home parenteral and enteral nutrition
- Initiate nutrition screening of older adults
- Work with other health professionals to expand services to elders, especially minority elders
- Create partnerships/coalitions with industry, national aging societies, advocacy organizations, and governmental agencies to promote nutrition and health education activities that respond to the needs of older adults
- Create partnerships/coalitions with older adult organizations to develop programs that ensure quality of life
- Advocate legislative changes and influence public policy affecting programs for adults at the local, state, and national levels
- Take proactive roles in garnering support for strengthened regulations/requirements at federal, state, and local levels
- Accept cross-functional leadership roles to change the availability of nutrition services and increased use of the dietetics professional
- Networking among dietetic practice groups

Academic Setting
- Mentor students about the opportunities available working with older adults
- Design curriculum that develops critical thinking and effective listening and written and oral communication skills
- Strengthen faculty and practitioners expertise in aging through various mechanisms including regional workshops, externships, certificate programs
- Create dietetic education supervised practice programs to match the changing environment of health care for older adults
- Design curriculum that addresses nutrition in aging throughout required courses for dietetic majors or develop independent courses focused on nutrition and older adults
- Develop multidisciplinary continuing education/distance learning courses for dietitians and other health professionals to disseminate the current information about effective nutrition support and/or education programs targeted to older adults
- Educate students on the value of comprehensive food and nutrition services and role of the dietetics professionals
- Educate students on the legislative process
- Networking among dietetic practice groups

Research Setting
- Conduct multidisciplinary research in the following areas:
- Identification of the predictors of malnutrition
- Validation of nutrition risk and nutrition related quality of life assessment instruments
- Development of evidence based practice guidelines and other resource materials for various resident settings
- Using Dietetic Practice Based Research Networks to document outcomes of food and nutrition programs
- Determination of essential nutrient requirements
- Establishment of references for the evaluation of nutritional status assessment data
- Exploration of relationship of lifestyle changes to quality of health and life for all racial ethnic groups, especially minority older adults
- Exploration of relationships between nutritional status and health of all racial ethnic groups
- Evaluation of the impact of food assistance and feeding programs, especially on minority older adults
- Document the value (monetary value in health cost savings) of comprehensive food and nutrition services and role of the dietetics professionals
- Communicate research findings
- Networking among dietetic practice groups

Figure 2. Actions for dietetics professionals to ensure quality food and nutrition services across the spectrum of aging.

chronic diseases and conditions prevalent in older adults achieve positive outcomes and reduce health costs (119).

Dietetics professionals have the unique opportunity to lead in championing the health and well-being of older adults (Figure 2). Dietetics professionals must be proactive in demonstrating the value of comprehensive food and nutrition services. They must adopt a holistic conceptualization of aging in which the emotional, supportive, and medical treatment aspects of food and nutrition interface with independence, health, intellectual stimulation, spirituality, religious practice, and social networks (Figure 1). There are distinct challenges and opportunities ahead in the service coordination and provision of

nutrition care and in the availability and expertise of dietetics professionals (Figure 2).

Provision of the necessary food and nutrition services and availability of dietetics professionals across the spectrum varies widely (43). Additionally, a well-coordinated delivery system of primary, secondary, and tertiary nutrition and supportive and medical services across home, community, and acute and long-term care settings are lacking (43).

Dietetics professionals should first identify local, state, and national issues and problems affecting service coordination. They can then take action by evaluating existing models of nutrition service coordination (105,133) and developing one or several models unique to their local and state home and community and acute and long-term care settings. They can then use this model(s) to pull together all service facets and present the concept to their decision makers and service agencies. Through the use of dietetic practice-based research networks, they can undertake applied research projects to provide evidence that their suggested solutions work. Then, they can take cross-functional leadership roles to change the availability of nutrition services and increased use of the dietetics professional. They can work to change policies through their interdisciplinary orientation and networking skills to cut across disciplines and bridge service gaps and cross barriers to coordinate better and expand the array of nutrition, health, and supportive services available to older adults and their families.

Nutrition care is most effective when it is integrated into comprehensive, interdisciplinary case/care management across all settings (Figure 2). Everyone, including the client and family/caregiver, is involved in the planning and decision making. Nutrition screening, assessment, and care planning and provision of MNT are all considered within the interdisciplinary team process (43). The methods of providing food and nutrition services are changing. Information technology increasingly will influence how nutrition messages and MNT are provided to clients and how progress is reported to interdisciplinary colleagues and funders (43,101,133). The type of services traditionally provided in acute care facilities is shifting to home care and reaching new audiences. For example, dietetics professionals can expand their roles in dependent home care and play a significant role in preparing individuals for caregiving responsibilities, especially for caregivers of patients receiving home parenteral and enteral nutrition (94,121). Dietetics professionals will practice using protocols/guides developed from scientific evidence, in addition to integrating individual knowledge and experience (129). The unique contributions by dietetics professionals are identified when part of a nutrition care process that includes evidence-driven nutrition assessment, nutrition diagnosis, nutrition intervention, and outcome evaluation (133). Dietetic Practice Groups must work together at national, state, and local levels to network, learn complementary practices, and build active referral systems to expand the availability of practitioners who can help meet the demand.

To reverse the trend in increasing prevalence of obesity, hypertension, and diabetes mellitus, dietetics professionals need to target both children and adults because aging does begin at conception.

There are opportunities for dietetics professionals in the aging field, yet practitioners may not be aware of the demand or may not have been exposed to nutrition and aging (11). It is difficult to advocate for increased food and nutrition services for this population if there are insufficient numbers of dietetics professionals ready to fill the demand (101). Actions dietetics professionals can take are outlined in Figure 2. Educational experiences working with older adults in settings across the spectrum of aging should alert entry-level students to this growth area. Continuing education opportunities should be available for dietetics professionals seeking to change career directions.

ONGOING NUTRITION RESEARCH

The links between diet, physical activity, and chronic disease risks have been documented. Now the critical research challenge lies in deciding which aspects of diet, nutrition, and physical activity contribute the most to quality-of-life measures. For example, research on the role of selected nutrients such as antioxidants in prevention of disease that focuses on the complexities of diet, genetics, and environment in the disease process is needed. This type of research is important to make it possible for individuals to derive optimal health-promoting benefits from foods in the context of changing dietary patterns.

There is interest in conducting outcomes research and collecting evidence to determine the effectiveness of nutrition services including MNT and the role of the dietetics professional in providing care to older adults across all settings in the spectrum (130,133). A measure of nutrition-related quality of life has been proposed (131,132), but more research is needed to define a validated measure of nutrition-related quality of life, as well as quality of life.

The oxidation of lipids, nucleic acids, or protein has been suggested to be involved in the etiology of several chronic diseases, including cardiovascular disease, cancer, cataracts, age-related macular degeneration, and aging in general. Much research on the potential role of antioxidants has been conducted over the past decades; however, much still remains unknown. The use of functional biomarkers of oxidative stress in future research to explore the relationships between the antioxidant nutrients and chronic disease risk is recommended. In addition, biomarkers can be used to identify dietary patterns associated with the reduced risk of chronic disease and to develop dietary recommendations.

To reverse the trend in increasing prevalence of obesity, hypertension, and diabetes mellitus, dietetics professionals need to target both children and adults because aging does begin at conception. More needs to be known about motivations for behavioral changes and perceived benefits of diet and nutrition interventions, programs, and therapies as assessed using quality-of-life measures.

References

1. Administration on Aging. Healthy People 2010. Available at: www.aoa.gov/prof/aoaprog/healthpromo/healthpromo-pf_asp. Accessed October 20, 2003.
2. Schiller JS, Bernadel L. Summary Health Statistics for the US Population: National health interview, 2002. *Vital Health Stat*. 2004;10:58.
3. Rowe JW, Kahn RL. *Successful Aging*. New York, NY: Pantheon Books; 1998.
4. Centers for Disease Control and Prevention. Healthy aging: preventing disease and improving quality of life among older Americans. Available at: http://www.cdc.gov/nccdphp/aag/aag_aging.htm. Accessed January 27, 2005.
5. Administration on Aging. Profile of Older Americans: 2002. Available at: http://www.aoa.gov/aoa/stats/profile/2002/2002profile.pdf. Accessed September 15, 2003.
6. US Census Bureau. The older foreign-born population of the United States: 2000. Available at: http://www.census.gov/prod/2002pubs/p23-211.pdf. Accessed January 27, 2005.
7. US Census Bureau. *Statistical Abstract of the United States: 2002* (122nd ed). Available at: http://www.census.gov/prod/2003pubs/02statab/pop.pdf. Accessed September 15, 2003.
8. Hetzel L, Smith A. The 65 years and over population: 2000. Available at: http://www.census.gov/prod/2001pubs/c2kbr01-10.pdf. Accessed September 25, 2003.
9. Goulding MR, Rogers ME, Smith SM. Public health and aging: Trends in aging—United States and worldwide. *MMWR*. 2003;52:101-106.
10. Arias E, Smith BL. Deaths: Preliminary data for 2001. *National Vital Statistics Reports*. Vol. 51, No. 5. Hyattsville, MD: National Center for Health Statistics; 2003.
11. American Dietetic Association. Report of the task force on aging. Available at: http://www.eatright.org/Member/Files/AgingReport.pdf. Accessed on November 8, 2004.
12. Terry DF, Wilcox M, McKormick MA, Lawler E, Perls TT. Cardiovascular advantages among the offspring of centenarians. *J Gerontol A Biol Sci Med Sci*. 2003; 58:M425-M431.
13. Perls T. Genetic and environmental influences on exceptional longevity and AGE nomogram. *Ann N Y Acad Sci*. 2002:959:1-13.
14. Perls T, Levenson R, Regan M, Puca A. What does it take to live to 100? *Mech Ageing Dev*. 2002; 123:231-242.
15. Jeune B. Living longer—but better? *Aging Clin Exp Res*. 2002;14:72-93.
16. Tanaka M, Gong J, Zhang J, Yamada Y, Borgeld HJ, Yagi K. Mitochondrial genotype associated with longevity and its inhibitory effect on mutagenesis. *Mech Ageing Dev*. 2000;116:65-76.
17. De Benedictus G, Carrieri G, Varcasia O, Bonafe M, Franceschi C. Inherited variability of the mitochondrial genome and successful aging in humans. *Ann N Y Acad Sci*. 2000;908:208-218.
18. Barzilai N, Gabriely I, Gabriely M. Iankowitz N, Sorkin JD. Offspring of centarians have a favorable lipid profile. *J Am Geriatr Soc*. 2001;49:76-79.
19. Rabini RA, Vignini A, Martarelli D, Nanetti L, Salvolini E, Rizzo MR, Ragno E, Paolisso G, Franceschi C, Mazzanti L. Evidence for reduction of pro-atherosclerotic properties in platelets from healthy centenarians. *Exp Gerontol*. 2003;38:367-371.
20. Mecocci P, Polidori MC, Troiano L, Cherubini A, Cecchetti R, Pini G, Straatman M, Monti D, Stahl W, Sies H, Franceschi C, Senin U. Plasma antioxidants and longevity: A study on healthy centenarians. *Free Radic Biol Med*. 2000; 28:1243-1248.
21. Klapcinska B, Derejczyk J, Wieczorowska-Tobis K, Sobczak A, Sadowska-Krepa E, Danch A. Antioxidant defense in centenarians. *Acta Biochimica Polonica*. 2000;47:281-292.
22. Rabini RA, Moretti N, Staffolani E, Nanetti L, Franceschi C, Mazzanti L. Reduced susceptibility to peroxidation of erythrocyte plasma membranes from centenarians. *Exp Gerontol*. 2002;37:657-663.
23. Centers for Disease Control and Prevention. Racial and ethnic approaches to Community Health (REACH 2010): Addressing disparities in health. Available at: http://www.cdc.gov/nccdphp/aag/aag_reach.htm. Accessed December 17, 2004.
24. Keppel KG, Pearcy JN, Wagener DK. Trends in racial and ethnic-specific rates for the Health Status Indicators: United States, 1990-1998. *Healthy People Statistical Notes, No. 23*. Hyattsville, MD: National Center or Health Statistics; 2002.
25. Dunlop DD, Manheim LM, Chang RW. Gender and ethnic/racial disparities in health utilization among older adults. *J Gerontol Soc Sci*. 2002;57:S221-S233.
26. Proctor BD, Dalaker J. Poverty in the United States: 2001 (US Census Bureau Web site). Available at: http://www.census.gov/prod/2002pubs/p60-219.pdf. Accessed December 17, 2004.
27. Food Security Institute. Hunger and food insecurity among the elderly. Available at: http://www.centeronhunger.org.pdf/Elderly.pdf. Accessed March 15, 2004.
28. Dixon LB, Winkleby MA, Radimer KL. Dietary intakes and serum nutrients differ between adults from food-insufficient and food-sufficient families: Third National Health and Nutrition Examination Survey, 1988-1994. *J Nutr*. 2001;131:1232-1246.
29. Guthrie JF, Lin BH. Overview of the diets of lower- and higher-income elderly and their food assistance options. *J Nutr Educ Behav*. 2002;34(suppl 1):S31-S41.
30. Amarantos E, Martinez A, Dwyer J. Nutrition and quality of life in older adults. *J Gerontol Biol Sci Med Sci*. 2001;56A:54-64.
31. Thomas DR, Morley JE. Regulation of appetite in older adults. Available at: http://www.ltcnutrition.org/PDF/ApetiteRegulation.pdf. Accessed October 13, 2004.
32. Institute of Medicine. Dietary reference intakes for vitamins. Available at: http://www.iom.edu/includes/DBFile.asp?id=7296. Accessed December 17, 2004.

33. Institute of Medicine. Dietary reference intakes for minerals. Available at: http://www.iom.edu/file.asp?id=7294. Accessed December 17, 2004.
34. Institute of Medicine. Dietary reference intakes for energy, carbohydrate, fiber, fat, fatty acids, cholesterol, protein, and amino acids, September 5, 2002. Available at: http://www.iom.edu/includes/DBFile.asp?id=7300. Accessed December 17, 2004.
35. Institute of Medicine. Dietary reference intakes for water, potassium, sodium, chloride, and sulfate. Available at: http://www.nap.edu. Accessed February 26, 2004.
36. Wakimoto P, Block G. Dietary intake, dietary patterns, and changes with age: An epidemiological perspective. *J Gerontol A Biol Sci Med Sci*. 2001;56A:65-80.
37. Guralnik JM, Eisenstaedt RS, Ferruci L, Klein HG, Woodman RC. The prevalence of anemia in persons age 65 and older in the United States: Evidence for a high rate of unexplained anemia. *Blood*. 2004;104:2263-2268.
38. Malouf R, Grimley EJ. The effect of Vitamin B6 on cognition. *Cochrane Database Syst Rev*. 2003;4:CD004393.
39. Rampersaud GC, Kauwell GP, Bailey LB. Folate: A key to optimizing health and reducing disease risk in the elderly. *J Am Coll Nutr*. 2003;22:1-8.
40. Morley JE. Decreased food intake with aging. *J Gerontol A Biol Sci Med Sci*. 2001;56A:81-88.
41. Juan WY, Lino M, Basiotis PP. Quality of diets of older adults. nutrition insight 29. Alexandria, VA. Center for Nutrition Policy and Promotion; 2004. Available at: http://www.usda.gov/cnpp/Insights/insight29.pdf. Accessed on January 27, 2005.
42. Anorexia in the Elderly: An Update. Available at: http://www.ltcnutrition.org/index.cfm/Fuseaction/Publication.View/publication/anorexia.cfm?CFID=101940&CFTOKEN=47740735. Accessed January 27, 2005.
43. American Dietetic Association. Position of the American Dietetic Association: Nutrition, aging, and the continuum of care. *J Am Diet Assoc*. 2000;100:580-595.
44. Mokdad AH, Marks JS, Stroup DF, Gerberding JL. Actual causes of death in the United States, 2000. *JAMA*. 2004;291:1238-1245.
45. US Department of Agriculture. Diet and health. Food consumption and nutrient intakes. Available at: http://www.ers.usda.gov/briefing/DietAndHealth/data/foods/table1.htm. Accessed December 17, 2004.
46. Centers for Disease Control and Prevention. 5 A day. Available at: http://apps.nccd.cdc.gov/5ADaySurveillance/displayV.asp. Accessed December 17, 2004.
47. Cooper DA. Carotenoids in health and disease prevention: Recent scientific evaluations, research recommendations and the consumer. *J Nutr*. 2004;134:S221-S224.
48. Anderson RN. Deaths: Leading Causes for 2000. *National Vital Statistics Reports*. Vol. 50, No. 16. Hyattsville, MD: National Center for Health Statistics; 2002.
49. Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. The seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. *JAMA*. 2003;289:2363-2369.
50. Knoops KTM, deGroot LCPGM, Kromhout D, Perrin AE, Moreiras-Varela O, Menotti A, van Staveren WA. Mediterranean diet, lifestyle factors, and 10-year mortality in elderly European men and women. *JAMA*. 2004;292:1433-1439.
51. Psaltopoulou T, Naska A, Orfanos P, Trichopoulos D, Mountokalakis T, Trichopoulou A. Olive oil, the Mediterranean diet, and arterial blood pressure: The Greek European Prospective Investigation into cancer and nutrition (EPIC) study. *Am J Clin Nutr*. 2004;80:1012-1018.
52. Charlton KE. Eating well: Ageing gracefully! *Asia Pacific J Clin Nutr*. 2002;11(suppl 3):S607-S617.
53. National Center for Health Statistics. Dietary supplements. Available at: http://www.cdc.gov/nchs/data/nhanes/databriefs/dietary.pdf. Accessed December 17, 2004.
54. Hedley AA, Ogden CL, Johnson CL, Carroll MD, Curtain LR, Flegal KM. Prevalence of overweight and obesity among US children, adolescents, and adults, 1999-2002. *JAMA*. 2004;291:2847-2850.
55. Dewan S, Wilding JP. Obesity and type 2 diabetes in the elderly. *Gerontologist*. 2003;49:137-145.
56. Lapez-GarcAa E, Banegas JR, GutiArrez-Fisac JL, Pacrez-Regadera AG, Gaaan LD, RogrAguez-Artalejo F. Relation between body weight and health-related quality of life among th elderly in Spain. *Int J Obes Relat Metab Disord*. 2003;27:701-709.
57. Fields LE, Burt VL, Cutler JA, Hughes J, Roccella EJ, Sorlie P. The burden of adult hypertension in the United States 1999 to 2000. *Hypertension*. 2004;44:398-404.
58. US Department of Health and Human Services. *Bone Health and Osteoporosis: A report of the Surgeon General*. Rockville, MD; US Department of Health and Human Services, Office of the Surgeon General; 2004.
59. Orces CH, Casas C, Lee S, Garci-Cavazos R, White W. Determinants of osteoporosis prevention in low-income Mexican American women. *South Med J*. 2003;96:458-464.
60. Follin SL, Hansen LB. Current approaches to the prevention and treatment of postmenopausal osteoporosis. *Am J Health Syst Pharm*. 2003;60:883-901.
61. Kitchin B, Morgan S. Nutritional considerations in osteoporosis. *Curr Opin Rheumatol*. 2003;15:476-480.
62. Nieves JW. Calcium, Vitamin D, and nutrition in elderly adults. *Clin Geriatr Med*. 2003;19:321-335.
63. Mozaffarieh M, Sacu S, Wedrich A. The role of the carotenoids, lutein and zeaxanthin in protecting against age-related macular degeneration: A review based on controversial evidence. *Nutr J*. 2003;2:20.

64. Bartlett H, Eperjesi F. Age-related macular degeneration and nutritional supplemention: A review of randomized controlled trials. *Ophthalmic Physiol Opt*. 2003;23:383-399.
65. American Dietetic Association. Position of the American Dietetic Association: Integration of medical nutrition therapy and pharmacotherapy. *J Am Diet Assoc*. 2003;103:1363-1370.
66. Nied RJ, Franklin B. Promoting and prescribing exercise for the elderly. *Am Fam Physicians*. 2002;65:419-426.
67. NIH Consensus Development Panel on osteoporosis prevention, diagnosis, and therapy. *JAMA*. 2001;285:785-795.
68. Drenowski A, Evans WJ. Nutrition, physical activity, and quality of life in older adults: Summary. *J Gerontol A Biol Sci Med Sci*. 2001;56A:89-94.
69. Health Behaviors of Adults in the US 1999-2000. Series 10, No. 219. Available at: http://www.cdc.gov/nchs/data/series/sr_10/sr10_219campanion.pdf. Accessed September 10, 2004.
70. Spirduso WW, Cronin DL. Exercise dose-response effects on quality of life and independent living in older adults. *Med Sci Sports Exerc*. 2001;33(suppl 6): S598-S608.
71. Kahana E, Lawrence RH, Kahana B, Kercher K, Wisniewski A, Stoller E, Tobin J, Stange K. Long-term impact of preventive proactivity on quality of life of the old-old. *Psychosom Med*. 2002;64:382-394.
72. Schmitz KH, Jensen MD, Kugler KC, Leon AS. Strength training for obesity prevention in midlife women. *Int J Obes Relat Metab Disord*. 2003;27:326-333.
73. Wong CH, Wong SF, Pang WS, Azizah MY, Dass MJ. Habitual walking and its correlation to better physical function: implications for prevention of physical disability in older persons. *J Gerontol A Biol Sci Med Sci*. 2003;58:555-560.
74. Gregg EW, Gerzoff RB, Caspersen CJ, Williamson DF, Narayan KM. Relationship of walking to mortality among US adults with diabetes. *Arch Intern Med*. 2003;163:1440-1447.
75. Binder EF, Schechtman KB, Ehsani AA, Steger-May K, Brown M, Sinacore DR, Yaraheski KE, Holloszy JO. Effects of exercise training on frailty in community-dwelling older adults: Results of a randomized, controlled trial. *J Am Geriatr Soc*. 2002;50:1921-1928.
76. Feskanich D, Willett W, Colditz G. Walking and leisure-time activity and risk of hip fracture in postmenopausal women. *JAMA*. 2002;288:2300-2306.
77. Brassington GS, Atienza AA, Perczek RE, DiLorenzo TM, King AC. Intervention-related cognitive versus social mediators of exercise adherence in the elderly. *Am J Prev Med*. 2002; 23(suppl 2):80-86.
78. Li F, Harmer P, McAuley E, Fisher KJ, Duncan TE, Duncan SC. Tai Chi, self-efficacy, and physical function in the elderly. *Prev Sci*. 2001;2:229-239.
79. Belza B, Walwick J, Shiu-Thornton S, Schwartz S, Taylor M, LoGerfo J. Older adult perspectives on physical activity and exercise: Voices from multiple cultures. *Preventing Chronic Disease: Public Health Research, Practice, and Policy*. Available at: http://www.cdc.gov/pcd/issues/2004/oct/pdf/04_0028.pdf. Accessed on January 27, 2005.
80. Gall TL. The role of religious resources for older adults coping with illness. *J Pastoral Care Counsel*. 2003;57:211-224.
81. Smith TB, McCullough ME, Poll J. Religiousness and depression: Evidence for a main effect and the moderating influence of stressful life events. *Psychol Bull*. 2003;129:614-636.
82. Koenig HG, George LK, Titus P. Religion, spirituality, and health in medically ill hospitalized old patients. *J Am Geriatr Soc*. 2004; 52:554-562.
83. National Institutes of Health. Dramatic decline in disability continues for older Americans, 2001. Available at: http://www.nia.nih.gov/HealthInformation/Publications/Reports/DeclineInDisability.htm. Accessed December 17, 2004.
84. National Center for Health Statistics. Chartbook on Trends in the Health of Americans, 2002. Available at: http://www.cdc.gov/nchs/hus.htm. Accessed December 17, 2004.
85. Summer L, O'Neill G, Shirey L. Arthritis. In: *Challenges for the 21st Century: Chronic and Disabling Conditions*, No. 5:1-6. Washington, DC: National Academy on an Aging Society; 2000.
86. Kamel HK. Sarcopenia and aging. *Nutr Rev*. 2003;61:157-167.
87. Iannuzzi-Sucich M, Prestwood KM, Kenny AM. Prevalence of sarcopenia and predictors of skeletal muscle mass in healthy, older men and women. *J Gerontol A Biol Sci Med Sci*. 2002;57: M772-M777.
88. Dellasega C, Zerbe TM. Caregivers of frail rural older adults. Effects of an advanced practice nursing intervention. *J Gerontol Nurs*. 2002;28:40-49.
89. Haley WE, LaMonde LA, Han B, Narramore S, Schonwetter R. Family caregiving in hospice: Effects on psychological and health functioning among spousal caregivers of hospice patients with lung cancer or dementia. *Hosp J*. 2001;15:1-18.
90. Navaie-Waliser M, Feldman PH, Gould DA, Levine C, Kuerbis AN, Donelan K. When the caregiver needs care: the plight of vulnerable caregivers. *Am J Public Health*. 2002;92:409-413.
91. Arno PS, Levine C, Memmott M. The economic value of informal caregiving. *Health Affairs*. 1999; 18:182-188.
92. Vitaliano PP, Zhang J, Scanlan JM. Is caregiving hazardous to one's health? A meta-analysis. *Psychol Bull*. 2003;129:1-27.
93. Silver HJ, Wellman NS. Nutrition education may reduce burden in family caregivers of older adults. *J Nutr Educ Behav*. 2002;34(suppl 1):S53-S58.
94. Silver HJ, Wellman NS. Family caregiver training is needed to improve outcomes for older adults using home care technologies. *J Am Diet Assoc*. 2002;102:831-836.
95. Burgener S, Twigg P. Relationships among caregiver factors and quality of life in care recipients with irreversible demen-

tia. *Alzheimer Dis Assoc Dis*. 2002;16:88-102.
96. Ryan C. Caregivers of the elderly: Lack of nutrition knowledge. *J Nutr Elder*. 1997;17:35-44.
97. Davis MA, Murphy SP, Neuhaus JM, Gee L, Quiroga SS. Living arrangements affect dietary quality for US adults aged 50 years and older: NHANES III 1988-1994. *J Nutr*. 2000;130: 2256-2264.
98. Federal Interagency Forum on Aging-Related Statistics. *Older Americans 2000: Key Indicators of Well-Being*. Washington, DC: US Government Printing Office; 2000.
99. Robert Wood Johnson Foundation. National study of adult day services 2001-2002. Available at: http://www.rwjf.org/news/special/adultdayServicesSummary.html. Accessed December 17, 2004.
100. Dausch JG. Aging issues moving mainstream. *J Am Diet Assoc*. 2003;103:683-684.
101. Jarratt J, Mahaffie JB. Key trends affecting the dietetics profession and the American Dietetic Association. *J Am Diet Assoc*. 2002;102:1821-1839.
102. 42 USC Chapter 35 Programs for Older Americans, §3001-30058ee (2000). Available at: http://uscode.house.gov/download/pls/42C35.txt. Accessed January 4, 2005.
103. US Administration on Aging. Highlights from the pilot study: First national survey of Older Americans Act Title III service recipients. Paper No. 2. Available at: http://www.gpra.net/surveys/2ndhighlights.pdf. Accessed May 14, 2004.
104. Ponza M, Ohls JC, Millen BE. *Serving Elders At Risk: The Older Americans Act Nutrition Programs, National Evaluation of the Elderly Nutrition Program* 1993-1995. Washington, DC: Mathematica Policy Research; 1996.
105. Millen BE, Ohls JC, Ponza M, McCool AC. The elderly nutrition program: An effective national framework for preventive nutrition interventions. *J Am Diet Assoc*. 2002;102:234-240.
106. Kretser AJ, Voss T, Kerr WW, Cavadini C, Friedmann J. Effects of two models of nutritional intervention on homebound older adults at nutritional risk. *J Am Diet Assoc*. 2003;103:329-336.
107. Gollub E, Weddle D. Improvements in nutritional intake and quality of life among frail homebound older adults receiving home-delivered breakfast and lunch. *J Am Diet Assoc*. 2004; 104:1227-1235.
108. Moran MB. Challenges in the Meals on Wheels program. *J Am Diet Assoc*. 2004;104:1219-1221.
109. Food Research and Action Center. Impact of the Food Stamp Reauthorization Act on elderly and disabled individuals. Available at: http://www.frac.org/html/publications/elderly-reauth.PDF. Accessed March 4, 2004.
110. US Department of Agriculture. Senior Farmers' Market Nutrition Program. An Overview of the SFMNP. Available at: http://www.fns.usda.gov/wic/SeniorFMNP/SeniorFMNPoverview.htm. Accessed March 4, 2004.
111. US Department of Agriculture. Senior Farmers' Market Nutrition Program Fact Sheet. Available at: http://www.fns.usda.gov/wic/SFMNPFactSheet.pdf. Accessed March 4, 2004.
112. US Department of Agriculture. Why is CACFP important? Available at: http://www.fns.usda.gov/cnd/Care/CACFP/aboutcacfp.htm. Accessed May 14, 2004.
113. US Department of Agriculture. Food and nutrition service food distribution fact sheet. Available at: www.fns.usda.gov/fdd/programs/tefap/pfs-tefap.pdf. Accessed October 13, 2004.
114. US Department of Agriculture, Commodity Supplemental Food Program. Food and nutrition service nutrition program fact sheet, June 2004. Available at: http://www.fns.usda.gov/fdd/programs/csfp/pfs-csfp.pdf. Accessed January 31, 2005.
115. Fey-Yensan N, English C, Pacheco HE, Belyea M, Schuler D. Elderly food stamp participants are different from eligible nonparticipants by level of nutrition risk but not nutrient intake. *J Am Diet Assoc*. 2003;103:103-107.
116. Sasser K, Contreras M, Taylor C, Gates G. Health and nutritional status of elderly food stamp participants. *J Nutr Elder*. 2002;22:1-14.
117. Kunkel ME, Luccia B, Moore AC. Evaluation of the South Carolina seniors farmers' market nutrition education program. *J Am Diet Assoc*. 2003;103:880-883.
118. Johnson DB, Beaudoin S, Smith LT, Beresford SAA, LoGerfo JP. Increasing fruit and vegetable intake in homebound elders: The Seattle Senior Farmers' Market Nutrition Pilot Program. Available at: http://www.cdc.gov/pcd/issues/2004/jan/03_00010a.htm. Accessed March 4, 2004.
119. Committee on Nutrition Services for Medicare Beneficiaries, Food and Nutrition Board. The Role of Nutrition in Maintaining Health in the Nation's Elderly: Evaluating Coverage of Nutrition Services for the Medicare Population. Washington, DC: Institute of Medicine; 1999.
120. American Dietetic Association. CMS outlines final rules for preventive benefits. Available at: http://www.eatright.org/Member/PolicyInitiatives/83_21213.cfm. Accessed January 31, 2005.
121. American Dietetic Association. Practice report of the American Dietetic Association: Home care—an emerging practice area for dietetics. *J Am Diet Assoc.* 1999;99:1453-1459.
122. Rosenzweig LY, Weddle DO. A comparison of OASIS, NSI LEVEL 1 and agency initiated screening and assessment methods to identify clients at nutritional risk and the provision of in-home nutrition services. *J Am Diet Assoc.* 2002;102(suppl 2):A-38.
123. Using Medicaid waiver Funding for Nutrition Services. Available at: http://www.fiu.edu/~nutreldr/AsktheExpert/HCBS/HCBS.htm. Accessed November 15, 2004.
124. American Dietetic Association. Position of the American Dietetic Association: Liberalized diets for older adults in long-term care. *J Am Diet Assoc.* 2002;102: 1216-1223.
125. Splett PL, Roth-Yousey LL, Vogelzang JL. Medical nutrition therapy for the prevention and treatment of unintentional

weight loss in residential healthcare facilities. *J Am Diet Assoc*. 2003;103:352-362.
126. Nursing Home Compare (Medicare Web site). Available at: http://www.medicare.gov/NHCompare/Static/Related/DataCollection.asp?dest=NAV Home DataDetails DataCollection#TabTop. Accessed November 19, 2004.
127. Chao S, Hagisavas V, Mollica R, Dwyer J. Time for assessment of Nutrition services in assisted living facilities. *J Nutr Elder*. 2003;23:41-55.
128. Lowe TJ, Lucas JA, Castle NG, Robison JP, Crystal S. Consumer satisfaction in long-term care: State Initiatives in nursing homes and assisted living facilities. *Gerontologist*. 2003;43:883-896.
129. Smith R. Expanding medical nutrition therapy: An argument for evidence-based practices. *J Am Diet Assoc*. 2003;103:313-314.
130. Trostler N, Myers EF. Blending practice and research: Practice-based research networks an opportunity for dietetics professionals. *J Am Diet Assoc*. 2003; 103:626-632.
131. Barr JT, Schumacher GE. The need for a nutrition-related quality-of-life measure. *J Am Diet Assoc*. 2003;103:177-180.
132. Barr J, Schumacher G. Using focus groups to determine what constitutes quality of life in clients receiving medical nutrition therapy: First steps in the development of a nutrition quality-of-life survey. *J Am Diet Assoc*. 2003;103:844-851.
133. Splett P, Myers EF. A proposed model for effective nutrition care. *J Am Diet Assoc*. 2001; 101:357-363.

ADA position adopted by the House of Delegates on October 26, 1986, and reaffirmed on October 24, 1991; September 15, 1995; September 28, 1998; and July 23, 2002. This position will be in effect until December 31, 2009. *Authors:* Marie Fanelli Kuczmarski, PhD, RD (University of Delaware, Newark, DE); Dian O. Weddle, PhD, RD, FADA (Florida International University, Miami, FL). *Reviewers:*Victoria Hammer Castellanos PhD, RD (Florida International University, Miami, FL); *Dietetic Technicians in Practice dietetic practice group:* (Deborah L. Redditt, DTR, Clinical Nutrition Management Consultant, Palm City, FL); Johanna Dwyer, DSc, RD (Friedman School of Nutrition Science and Policy And School of Medicine, Tufts University And Frances Stern Nutrition Center, Tuft-New England Medical Center, Boston, MA); *Gerontological Nutritionists dietetic practice group:* (Lester Rosenzweig, MS, RD, Nutrition Consultant, Albany, NY; Susan Saffel-Shrier, MS, RD, University of Utah School of Medicine, Salt Lake City, UT); Linda Kautz Osterkamp, PhD, RD (Nutrition Consultant and Adjunct Faculty, University of Arizona, Tucson, AZ); Mary Ellen Posthauer, RD (MEP Healthcare Dietary Services, Inc, Evansville, IN); *Public Health and Community Nutrition dietetic practice group:* (Cindy M. Brison, MS, RD, University Extension in Douglas/Sarpy County, Omaha, NE); Carlene Russell, MS, RD (Iowa Department of Public Health and Elder Affairs, Des Moines, IA). *APC Workgroup:* Barbara Paulsen, MS, RD (chair); Carolyn Manning, MAg, RD; Dianne Polly, RD, JD (content advisor).